

Seabirds to seascapes

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Planning &
Environment



TARONGA
CONSERVATION SOCIETY AUSTRALIA™

Estuaries and coasts are economic centres

- >85% of people in NSW live within 50 kilometres of the coast
- coastal tourism employs more than 142,000 or about 24% of employees working in the coastal zone

Sydney Harbour:

- Catchments home to 3.07 million people
- >\$42 billion to the economy every year

Annual revenues & values		
\$ MILLIONS PER YEAR		
Ports	Management of commercial & cruise shipping	\$430
Maritime	Upkeep ferry infrastructure, boat licences	\$35
Transport	Ferries (not including fast ferries & water taxis)	\$175
Tourism	Cruise ship passenger spend & operations	\$1025
Icons	▶ Opera House - ticket sales & assoc. businesses	\$254
	▶ Taronga Zoo - ticket sales	\$42
Major events	NYE fireworks, Vivid, Syd-Hobart race & others	\$400

SMH (2015) Adapted from Hoisington

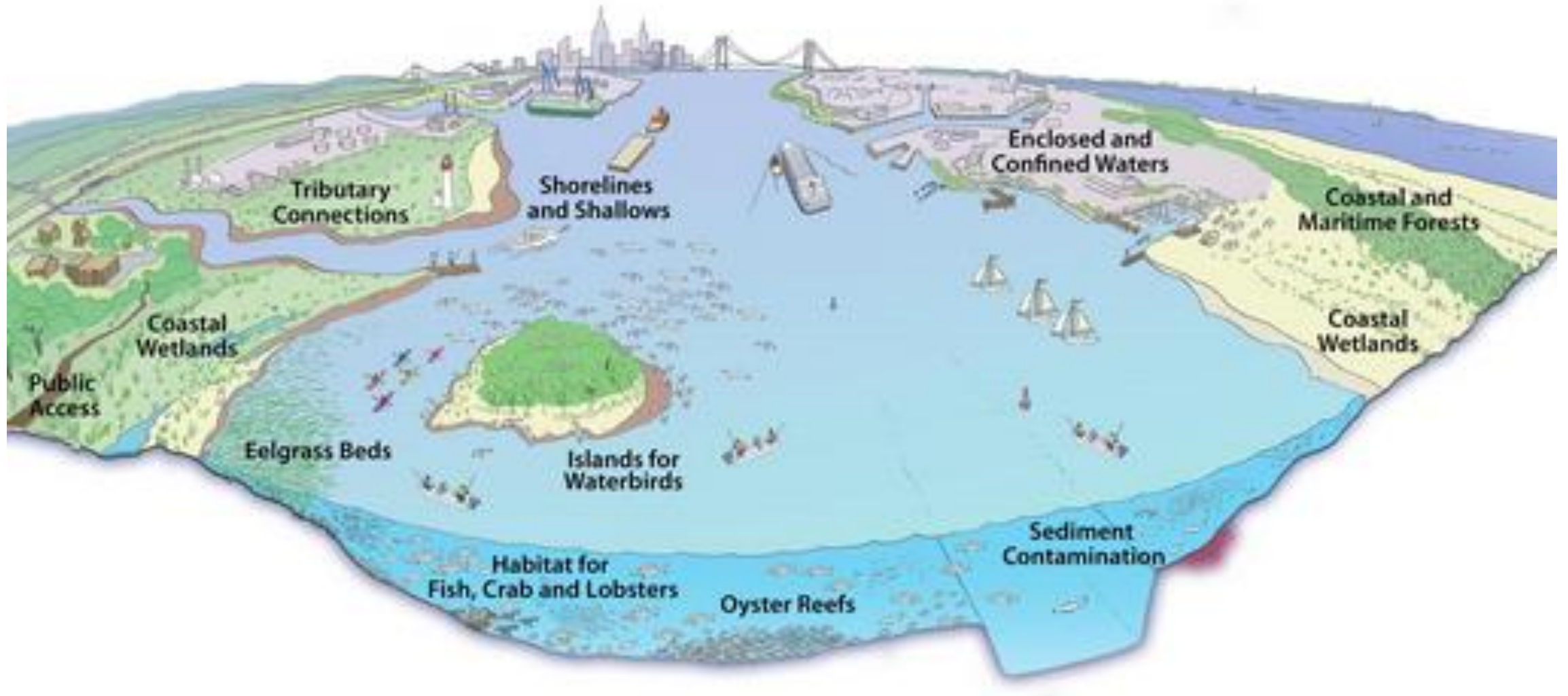
Much of this economic value is underpinned by ecosystems



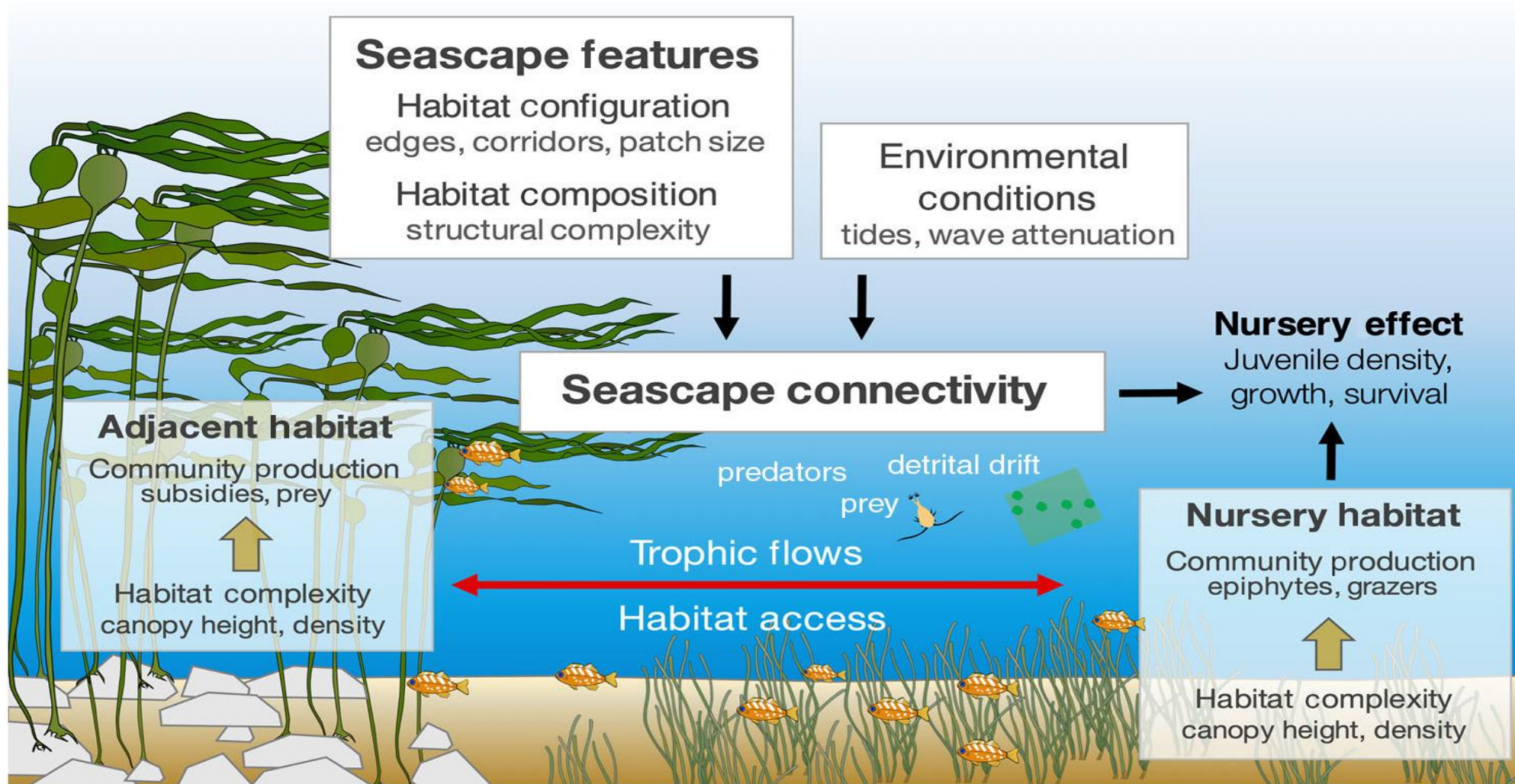
Ecosystem services: estuarine and coastal habitats

Direct and Indirect Services	** Estuaries and Marshes	Mangroves	Lagoons and Salt Ponds	Intertidal	Kelp	Rock and Shell Reefs	Seagrass	**Coral Reefs
Food	●	●	●	●	●	●	●	●
Fibre, timber, fuel	●	●	●					
Medicines, other	●	●	●		●			●
Biodiversity	●	●	●	●	●	●	●	●
Biological regulation	●	●	●	●		●		●
Freshwater storage and retention	●		●					
Biochemical	●	●			●			●
Nutrient cycling and fertility	●	●	●	●	●	●		●
Hydrological	●		●					
Atmospheric and climate regulation	●	●	●	●		●	●	●
Human disease control	●	●	●	●		●	●	●
Waste processing	●	●	●			●	●	●
Flood/storm protection	●	●	●	●	●	●	●	●
Erosion control	●	●	●				●	●
Cultural and amenity	●	●	●	●	●	●	●	●
Recreational	●	●	●	●	●			●
Aesthetics	●	●	●	●				●

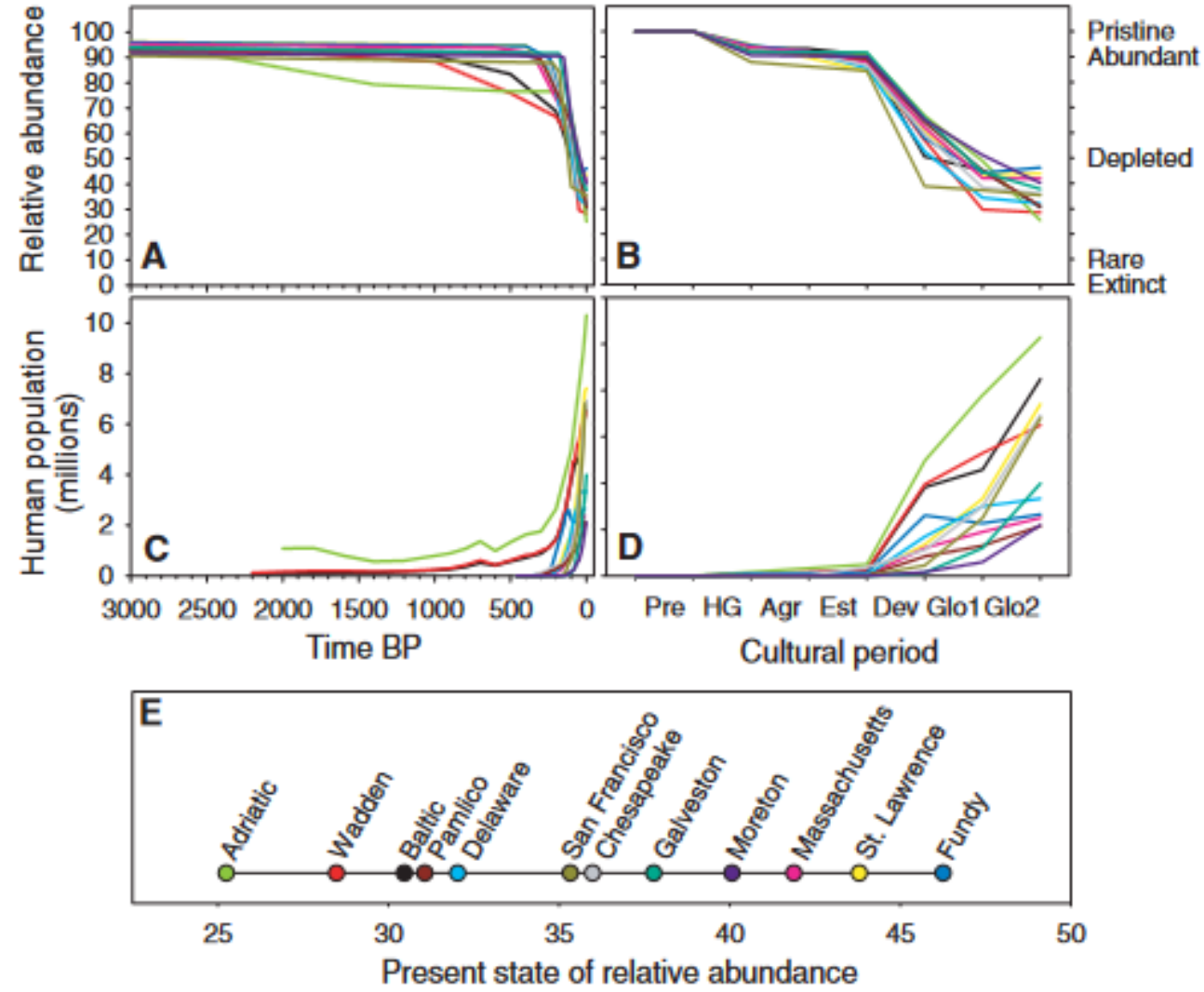
These ecosystems are interconnected



And so too is their health



Estuarine and coastal habitats have been degraded by centuries of human exploitation



Sydney Harbour is no exception

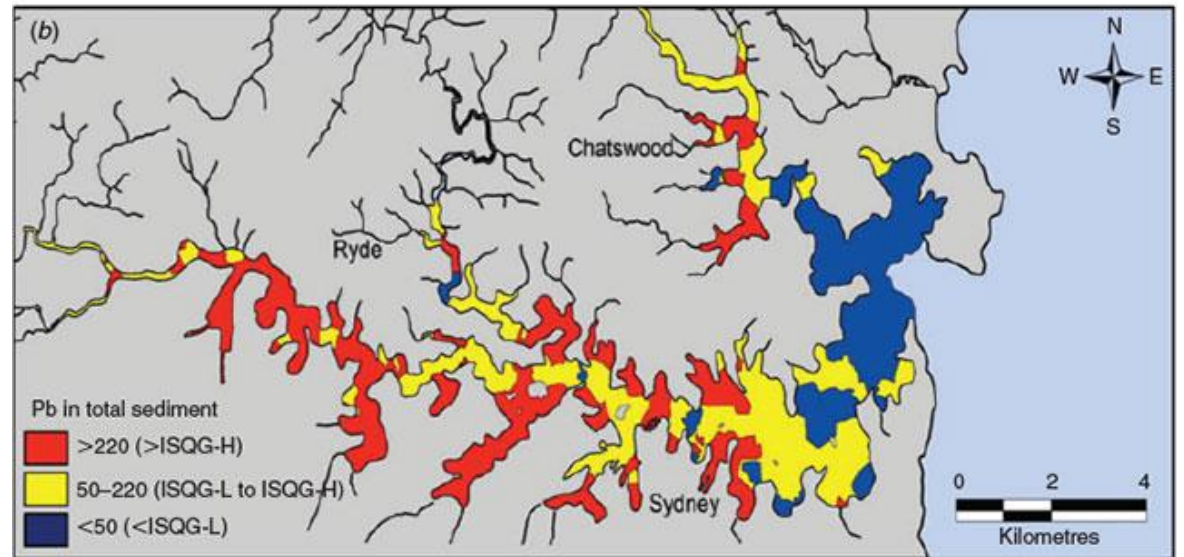
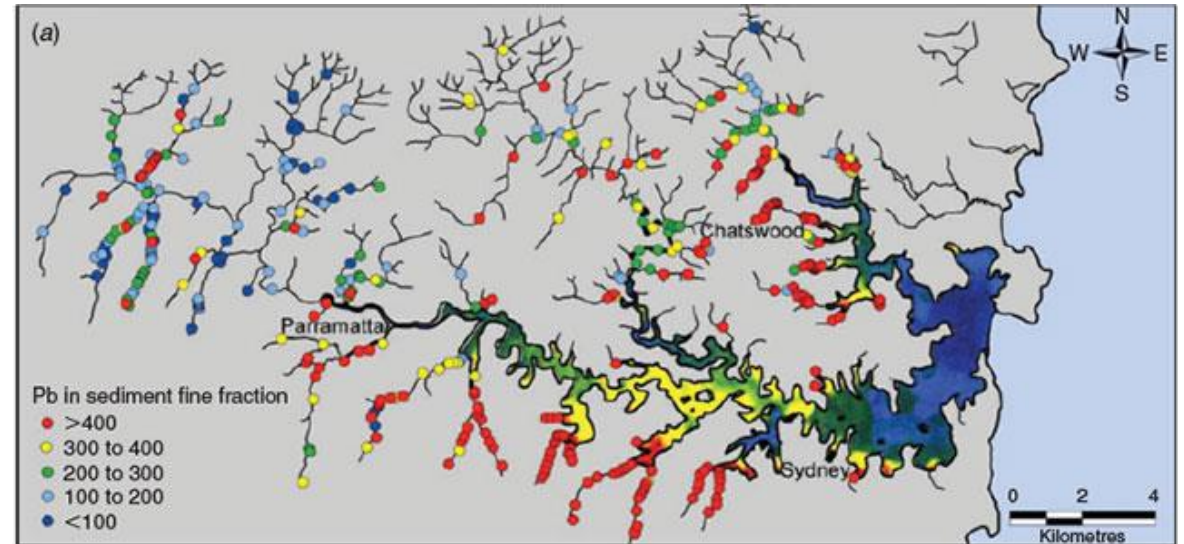
50% of shoreline hardened by built structures



Habitat destruction



Some of the most contaminated sediments in the world



Mayer Pinto et al. (2015) Mar FW Res

Yet the foundations for recovery remain



- 2473 species of polychaetes, crustaceans, echinoderms and molluscs (Hutchings et al. 2013)
- 586 fish species (Booth 2010; Hutchings et al. 2013)
- Remnant patches of seagrass, kelp, oyster habitat, mangrove

Seabirds to seascapes – protecting coastal biodiversity

\$9.1 million project funded by NSW Government including 3 elements:

- **restoring** Sydney Harbour's marine ecosystems by installing Living Seawalls, and replanting seagrass meadows and kelp forests
- supporting the future of **little penguins** by conducting the first ever statewide little penguin census to determine population size and response to climate change and
- helping **fur seals** thrive as a species by conducting a seal survey to identify their preferred habitat, breeding grounds, diet and key threats.

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Project restore

- Scale up restoration at the seascape level
- Build decision tools to guide site selection, considering both ecological and social benefits
- Quantify potential synergies derived from multi-species restoration
- Engage and communicate with the general public in new and innovative ways to raise awareness about our marine environment and the role of science in facilitating recovery

Outcomes

- Enhanced biodiversity and ecosystem health of Sydney Harbour
- Best-practice template that can be applied to other estuarine and coastal places
- Increased public awareness of the importance of conserving biodiversity in our oceans and on our coasts.



Science to Revive Our Oceans



Living Seawalls

Retro-fitting existing seawalls with ecologically friendly structures



Operation Crayweed

Restoring Sydney's Underwater Forests.



Operation Posidonia

Restoring Underwater Meadows



Sydney Harbour Research Program

Science for enhancement and sustainable use of Sydney's iconic waterways.

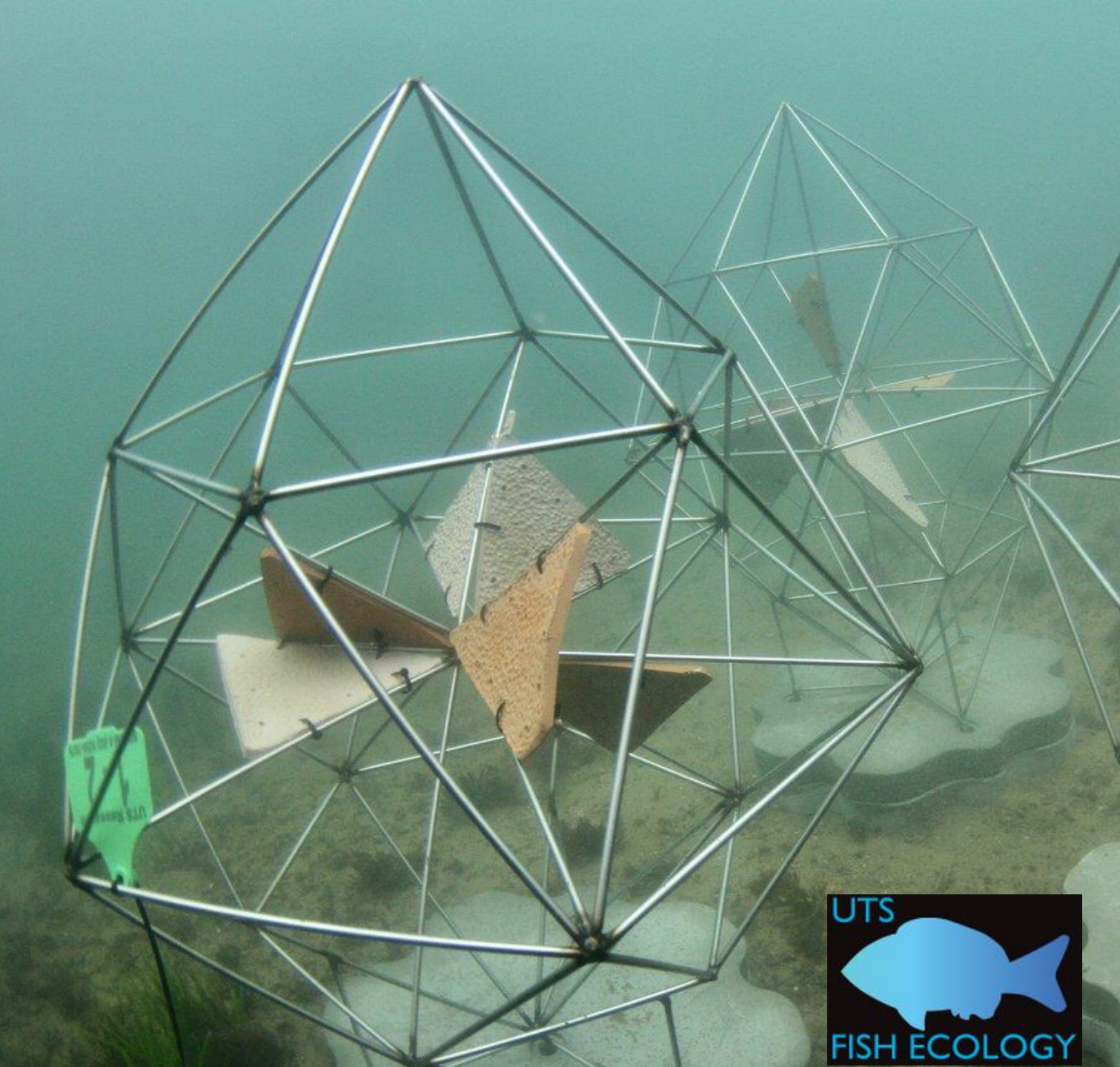
Living
SEAWALLS



THE
EARTHSHOT
PRIZE

FINALIST
LONDON 2021





REEF DESIGN LAB

HEALING OLD WOUNDS

RESTORING UNDERWATER MEADOWS



1. Remove the stressor



2. Collect shoots



3. Replant





John Turnbull



John Turnbull





Assessment of synergies

- Isotopes
- Animal tracking
- Associated community establishment

